thorough investigation as practicable of conditions in each locality in the preliminary plans for school buildings, and this generally can be done through near-by Weather Bureau stations.

It is obvious that south windows would catch the breezes from the southeast, south, and southwest; west windows would catch them from the southwest, west, and northwest. But west windows, it seems, are decidedly preferable from the standpoints of light and sanitation. Therefore, where the prevalence of south winds is very strong, as in the Southern States west of the Mississippi River, a choice of west or south windows may be difficult to make; but in the States east of the Mississippi River, generally speaking, it would seem that any sacrifice of other features to secure south breezes would be a mistake.

RADIO REPORTS GIVE TIMELY NOTICE OF RAINS IN CALIFORNIA.

By GEO. H. WILLSON, Meteorologist.

[Weather Bureau, San Francisco, Calif., April 26, 1923.]

From radio reports received twice daily at San Francisco from vessels in the North Pacific ocean the presence of storms and their approximate location is in nearly all instances known several days before their approach is indicated at coast stations, but the reports are generally so scattered that the direction in which the storm is moving and its rate of progression are too indefinite for use as a basis for a forecast. To make a definite forecast, that is, one that would be of any practical value, it is necessary to have sufficient data to know what the pressure distribution over the Canadian northwest, Rocky Mountain States and off the California coast will be about the time the storm is expected to reach the coast.

In general, a storm moving east or southeast from the North Pacific will not give rain in California unless its eastward movement is deflected southward by an area of high pressure over Alaska or British Columbia. When this is the case, the storm will, in nearly all cases, when about 500 or 1000 miles off the coast, develop a trough extending southward to about the latitude of San Francisco, and the center will enter the coast south of the Columbia river.

These conditions prevailed during the last week of March, 1923, and the writer was enabled to make a forecast of the approach of a storm several days in advance of its appearance on the coast. Subsequent comment by both the press and the public showed a deep appreciation of the work.

The storm which reached the Pacific coast on Friday night (March 30), and broke the long drought in California was first shown by a report from the S. S. *West Ivan* (en route from the Orient to San Francisco) on the morning of the 26th, when in latitude 37° N., longitude 151° W. On the morning of the 27th, the *West Ivan* in latitude 37° N., longitude 148° W.; *Bearport* in latitude 39° N., longitude 154° W.; *Protesilaus* in latitude 52° N., 157° W., and the *Wairuna* in latitude 36° N., longitude 140° W., showed the cyclonic circulation around a large storm, but no high winds or low pressures were reported. On the morning of the 28th, the *West Ivan* reported a barometer of 29.44 inches, with fresh southeasterly winds and rain, and was nearing the center of the storm, while the *Bearport*, about 500 miles to the northwest, reported fresh northwesterly gales. Based upon these reports the following statement was made to the manager of the Associated Press: "A storm is central about 1300 miles off the California-Oregon coast moving eastward and will probably reach the coast about Friday evening (March 30) and extend later into California and break the drought." Advisory warnings were also sent to all ports from San Francisco north, advising shipping about to sail for the Orient of the location of the storm and the time it would reach the coast.

On the afternoon and evening of the 28th, the *West Ivan* sent the following reports:

1 p m, barometer 29.34, wind southwest, force 10; 3 p m, barometer 29.26, wind southwest, force 10; 9 p m, barometer 29.08, wind west, force 9, and at 11 p m, barometer 29.14, wind west, force 9—

Showing that she had passed through the center of the storm. At this time the weather was clear over the entire Pacific coast and a marked warm wave was in progress. Cloudiness began to increase along the coast Friday morning from San Luis Obispo northward; by Saturday morning rain had begun at all coast stations from San Francisco north, and by night the rain area had extended over western Washington, western Oregon, northern California, and the northern portion of southern California.

SOME TEMPERATURE AND HUMIDITY RELATIONS OF THE AIR.

By W. J. HUMPHREYS.

[Weather Bureau, Washington, D. C., May 2, 1923.]

The following is only a condensed, and slightly modified, derivation of some of the more interesting portions of an important paper by Dr. C. W. B. Normand, published in 1921 as Part 1, Vol. 33, of the *Memoirs of the Indian Meteorological Department.*

Let an aspiration psychrometer meet the following conditions, as it may to any required approximation:

1. That there be no net radiation gain or loss by the thermometer element.

2. That there be no addition of heat to, or subtraction from, the system, air, water vapor, and water, within and passing through the psychrometer.

3. That the exit air be saturated. This assumption is not necessary, but convenient.

4. That the pressure be constant.

Let T be the absolute temperature of perfectly dry intake air (if not fully dry, some of the following equations will need slight but obvious changes); T' the absolute temperature of the wet bulb; C_p and C'_p the specific heats of dry air and of water vapor, respectively, at constant pressure; and x the mass ratio of water vapor to dry air in saturated air at the temperature T'.

Then, counting from the freezing point, the heat in $1+x$ grams of saturated air at the temperature T' is